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# D E C I S I O N
## of 8 October 2003

**Case Number:** W 0002/03 - 3.3.1

**Application Number:** PCT/EP 02/03697

**Publication Number:** WO 02/083699

**IPC:**

**Language of the proceedings:** EN

**Title of invention:**
Process for the production of monohalide or dihalide metallocene compounds

**Applicant:**
Basell Polyolefine GmbH

**Opponent:**
-

**Headword:**
Metallocene compounds/BASELL

**Relevant legal provisions:**
EPC Art. 154(3),
PCT Art. 17(3)(a)
PCT R. 13.1, 13.2, 40.1, 40.2

**Keyword:**
"Insufficient reasoning of the invitation to pay an additional search fee - failure to determine the technical problem and its solution - disregard of a decision of the Enlarged Board of Appeal - reimbursement of the additional search fee and the protest fee"

**Decisions cited:**
G 0001/89

**Catchword:**
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** W 0002/03 - 3.3.1

# D E C I S I O N
**of the Technical Board of Appeal 3.3.1**
**of 8 October 2003**

**Applicant:** Basell Polyolefine GmbH
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**Representative:** Basell Poliolefine Italia S.p.A.
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**Decision under appeal:** **Protest according to Rule 40.2(c) of the Patent Cooperation Treaty made by the applicants against the invitation (payment of additional fees) of the European Patent Office (International Searching Authority) dated 23 September 2003.**

**Composition of the Board:**

**Chairman:** A. Nuss
**Members:** J. M. Jonk
B. Günzel

## Summary of Facts and Submissions

I. On 3 April 2002 the Applicant filed the international patent application PCT/EP 02/03697 comprising a set of 13 claims, independent Claims 1 and 5 reading as follows:

"1. A process for preparing dihalide or monohalide metallocene compounds of formula (I)

$$(Cp)(ZR^1_m)_n(A)_rML_qL'_s \quad (I)$$

wherein

$(ZR^1_m)_n$ is a divalent group bridging Cp and A; Z being C, Si, Ge, N or P, and the $R^1$ groups, equal to or different from each other, being hydrogen or linear or branched, saturated or unsaturated $C_1$-$C_{20}$ alkyl, $C_3$-$C_{20}$ cycloalkyl, $C_6$-$C_{20}$ aryl, $C_7$-$C_{20}$ alkylaryl or $C_7$-$C_{20}$ arylalkyl groups optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements or two $R^1$ can form a aliphatic or aromatic $C_4$-$C_7$ ring that can bear substituents;

Cp is a substituted or unsubstituted cyclopentadienyl group, optionally condensed to one or more substituted or unsubstituted, saturated, unsaturated or aromatic rings, containing from 4 to 6 carbon atoms, optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements;

A is O, S, $NR^2$, $PR^2$ wherein $R^2$ is hydrogen, a linear or branched, saturated or unsaturated $C_1$-$C_{20}$ alkyl, $C_3$-$C_{20}$ cycloalkyl, $C_6$-$C_{20}$ aryl, $C_7$-$C_{20}$ alkylaryl or $C_7$-$C_{20}$ arylalkyl, or A has the same meaning of Cp;

M is selected from zirconium, titanium or hafnium;

L equal or different from each other are selected from the group consisting of chlorine, bromine, iodine;

L' is selected from the group consisting of hydrogen, a linear or branched, saturated or unsaturated $C_1$-$C_{20}$ alkyl, $C_3$-$C_{20}$ cycloalkyl, $C_6$-$C_{20}$ aryl, $C_7$-$C_{20}$ alkylaryl or $C_7$-$C_{20}$ arylalkyl group, optionally containing one or more Si or Ge atoms;

m is 1 or 2, more specifically it is 1 when Z is N or P, and it is 2 when Z is C, Si or Ge;

n is 0, 1, 2, 3 or 4, being 0 when r is 0 or 2;

r is 0, 1 or 2;

q is 1, 2, or 3;

s is 0 or 1;

s and q satisfying the following equation: q+s=3-r;

said process comprising contacting a compound of formula (II):

$$(Cp)(ZR^1_m)_n(A)_rML'_y \quad (II)$$

wherein

Cp, Z, $R^1$, A, M, L', m, r and n have been described above and y is equal to s+q wherein s and q have been described above;

with an halogenating agent selected from the group consisting of $T^1L_w^1$, $T^2L_w^2$, $O=T^3L_w^3$, $R^6C(O)L$, $L_2$ and HL, mercury dichloride ($HgCl_2$) being excluded,

wherein:

$T^1$ is a metal of groups 3 -13 of the periodic table (new IUPAC version) or of the lanthanides series;

$T^2$ is a nonmetal element of groups 13-16 of the periodic table (new IUPAC version) with the exclusion of carbon;

$T^3$ is selected from the group consisting of C, P and S;

O is an oxygen atom bonded to $T^3$ through a double bond;

$R^6$ is selected from a linear or branched, saturated or unsaturated $C_1$-$C_{20}$ alkyl, $C_3$-$C_{20}$ cycloalkyl, $C_6$-$C_{20}$ aryl, $C_7$-$C_{20}$ alkylaryl or $C_7$-$C_{20}$ arylalkyl;

L has the same meaning as above;

H is hydrogen;

$w^1$ is equal to the oxidation state of the metal $T^1$;

$w^2$ is equal to the oxidation state of the element $T^2$;

$w^3$ is equal to the oxidation state of the element $T^3$ minus 2."

"5. A process for preparing dihalide or monohalide metallocene compounds of formula (I)

$$(Cp)(ZR^1_m)_n(A)_rML_qL'_s \quad (I)$$

wherein M, Cp, A, Z, $R^1$, r, m, n, q, s, L and L' have the meaning reported in anyone of claims 1-4 comprising the following steps:

(a) reacting a ligand of formula $(Y\text{-}Cp)(ZR^1_m)_n(A\text{-}Y)_r$ or when n is 0 a mixture of ligands Y-Cp and r(A-Y) with an amount EQ of a compound of formula $L'_jB$ or L'MgL''' such that EQ≥1+r molar equivalents with respect to Cp, wherein Cp, A, Z, $R^1$, m, r, q and L' have the meaning reported above; L''' is selected from the group consisting of chlorine, bromine, iodine; n is an integer having values 1, 2, 3 or 4; the groups Y, the same or different from each other, are suitable leaving groups; Mg is magnesium; B is an alkaline or alkaline-earth metal; and j is 1 or 2, j being equal to 1 when B is an alkali metal, and j being equal to 2 when B is an alkaline-earth metal;

(b) reacting the product obtained from step a) with at least 1 molar equivalent of a compound of formula $ML''_4$, wherein M have the meaning reported above,

L'' is selected from the group consisting of chlorine, bromine, iodine;

(c) if the amount EQ of a compound of formula $L'_jB$ or L'MgL'' added in step a) is less than 1+r+q, adding to the reaction mixture an amount of a compound of formula $L'_jB$ or L'MgL''' equal to or higher than 1+r+q-EQ molar equivalents;

(d) optionally purifying the mixture and separating the racemic and the meso forms; and

(e) reacting the mixture with an halogenating agent selected from the group consisting of: $T^1L_w^1$; $T^2L_w^2$; $O=T^3L_w^3$; $R^6C(O)L$; $L_2$ and HL wherein $T^1$, $T^2$, $T^3$, L, $w^1$, $w^2$, $w^3$ and $R^6$ have been described in anyone of claims 1-4."

Claims 2 to 4 and Claims 6 to 13 relate to particular embodiments of the claimed processes of Claims 1 and 5, respectively.

II. In a communication dated 23 September 2002, the European Patent Office (EPO), acting as International Searching Authority (ISA), invited the Applicant pursuant to Article 17(3)(a) and Rule 40.1 PCT to pay one additional search fee.

III. In this invitation to pay the additional fee (IPAF), the ISA considered that the application in suit comprised two different inventions, namely:

First invention (Claims 1 to 4):

A process for the replacement of hydrogen or hydrocarbyl on metallocenes with halogens.

Second invention (Claims 5 to 13):

A process for the preparation of mono or dihalo metallocenes comprising a first step of preparing a hydrogen or hydrocarbyl substituted metallocene and a second step of replacing the hydrogen or hydrocarbyl groups on the metallocene with one or two halogens.

IV. In this context, the ISA held that document

(1) Z. Naturforsch., **45b** (1990), pages 212 to 220,

already described the preparation of dihalo titanocene compounds and that, therefore, the processes of Claims 1 and 5 were not linked together by this feature so as to form a single inventive concept. Thus, in the absence of any other technical feature that could fulfil the role of a special technical feature within the meaning of Rule 13.2 PCT, the requirement of unity of invention as defined in Rule 13.1 PCT had not been met.

V. On 21 October 2002 the Applicant paid the additional search fee under protest accompanied by a statement to the effect that the application complied with the requirement of unity of invention in accordance with Rule 40.2(c) PCT.

He submitted that Claims 1 to 4 related to a process for the preparation of dihalide or monohalide metallocene compounds comprising the step of contacting a dialkyl or dihydride metallocene compound with a halogenating agent, and that Claims 5 to 13 concerned a process for the preparation of dihalide or monohalide metallocene compounds comprising the preparation of a dialkyl or dihydride metallocene compound (steps (a),(b), (c) and (d) of Claim 5) and contacting the so obtained starting compound with the same halogenating agent used according to Claims 1 to 4 (step (e) of Claim 5). Therefore, it was evident that the halogenation step was the key feature of the claimed processes and that this step formed the common technical relationship linking all Claims 1 to 13.

VI. In a notification pursuant Article 40.2(e) PCT dated 14 January 2003 the ISA's review panel invited the Applicant to pay the protest fee within one month, because the IPAF was justified.

It confirmed the reasoning given in the IPAF and considered that document (1) already described a process for the preparation of a dihalo titanocene starting from a dialkynyl titanocene and contacting said titanocene with a halogenating agent. Thus, the processes of Claims 1 and 5 were not linked together by this feature so as to form a single inventive concept within the meaning of Rules 13.1 and 13.2 PCT.

VII. On 28 January 2003 the Applicant paid the protest fee.

## Reasons for the Decision

1. The protest is admissible.

2. According to Article 154(3) EPC the boards of appeal are responsible for judging unity of invention when they decide on a protest made by an applicant against an additional fee charged by the EPO as the International Searching Authority (ISA) pursuant to Article 17(3)(a) PCT. Moreover, to the extent they find the protest justified, they have to order the total or partial reimbursement to the applicant of the additional fee (see Article 40(2)(c) PCT).

3. In the present case, the Applicant paid one additional fee for the second invention as defined in the invitation to pay the additional fee (IPAF).

4. The Board derives from the IPAF that the ISA based its objection of lack of unity of invention on the disclosure of document (1). The ISA considered therefore that the application lacked unity of invention *a posteriori*.

5. According to the decision of the Enlarged Board of Appeal G 1/89 (OJ EPO 1991,155) the EPO in its capacity as an ISA may, pursuant to Article 17(3)(a) PCT, request a further search fee where the application is considered to lack unity of invention *a posteriori*. However, the Enlarged Board of Appeal held that consideration by an ISA of the requirement of unity of invention should, of course, always be made with a view to giving the applicant fair treatment and that the charge of additional search fees should be made only in

clear cases. In particular, in view of the fact that such consideration under the PCT was being made without the applicant having had the opportunity to comment, the ISA should exercise restraint in assessing novelty and inventive step (which was ultimately the task of an examining authority) and in border-line cases preferably refrain from considering an application as not complying with the requirement of unity of invention on the ground of lack of novelty or inventive step (see point 8.2 of the Reasons).

6. Furthermore, pursuant to Rule 40.1 PCT the IPAF provided for in Article 17(3)(a) PCT shall specify the reasons for which the application is not considered as complying with the requirement of unity of invention. According to the established jurisprudence of the boards of appeal proper reasoning requires in this context, as a precondition, an analysis of the technical problem or problems underlying the application in suit, because only then is it possible to decide whether or not a common special technical feature within the meaning of Rules 13.1 and 13.2 PCT exists for different claimed embodiments. Thus, the disregard of this principle would be in itself sufficient justification for the reimbursement of the additional search fee(s) (see Case Law of the Boards of Appeal of the European Patent Office, 4th edition 2001, IX.C.2, page 577).

7. In the present case, the ISA subdivided the claimed subject-matter of the application in suit in view of the disclosure of document (1) into two inventions considered to differ from each other in that according to the first invention a starting compound of formula

(II) was reacted with a halogenating agent, whereas according to the second invention at first such a starting compound was prepared according to a specific process and then the halogenation step was performed.

In this context, the ISA only held that document (1) already described the preparation of a dihalo titanocene and that, therefore, the processes of Claims 1 and 5 were not linked together by this feature so as to form a single inventive concept.

8. However, this reasoning by the ISA does not comprise any analysis concerning the technical problem underlying the application in suit in the light of document (1) and its solution, which analysis is - as indicated under point 6 above - a precondition for adequate reasoning of lack of unity of invention.

9. In these circumstances, the Board finds that the IPAF was not adequately reasoned within the meaning of Rule 40.1 PCT.

10. Moreover, the ISA's finding of non-unity was also defective for another reason.

11. It is true that document (1) discloses a process for preparing dihalo bis(cyclopentadienyl)titanocene compounds by reacting a dialkynyl bis(cyclo-pentadienyl)titanocene compound with HX or $X_2$ (X = F, Cl or Br) (see page 217; and page 213, right column, second paragraph, concerning the meaning of R') and that this process indeed falls within the scope of Claim 1 of the application in suit (M=titanium,

Cp=cyclopentadienyl, n=0, A=Cp, r=1, L'=unsaturated $C_1$-$C_{20}$ alkyl, y=2, and L=Cl or Br).

12. However, this finding of lack of novelty of the process of Claim 1 is only based on one specific embodiment of the claimed process and does not automatically mean that remaining novel embodiments of the process of Claim 1 related to different starting compounds and/or different halogenating agents do not form a single general inventive concept as required under Rules 13(1) and 13(2) EPC.

13. For deciding whether or not claimed subject-matter forms a single general inventive concept and thus meets the requirement of unity of invention, the boards of appeal consistently apply the problem and solution approach, which involves essentially identifying the closest prior art, determining in the light thereof the technical problem which the claimed invention addresses and successfully solves, and examining whether or not the claimed solution to this problem is obvious for the skilled person in view of the state of the art.

If the technical results of the claimed invention provide some improvement over the closest prior art, the problem can be seen as providing such improvement, provided this improvement necessarily results from the claimed features for all that is claimed. If, however, there is no improvement, but the means of implementation are different, the technical problem can be defined as the provision of an alternative to the closest prior art.

14. In the present case, the technical problem underlying the application in suit in the light of document (1) as the closest prior art could therefore be seen in the provision of a novel alternative or even an improved process for preparing compounds of formula (I) as defined in Claim 1 as filed, depending on whether or not some improvement is achieved over said closest prior art.

Furthermore, the solution of a so defined technical problem will depend on the way in which the subject-matter of Claim 1 is delimited by the Applicant from that of document (1) on the basis of the claims and the description of the present application as filed. A proper delimitation might, for instance, be achieved by claiming the use of compounds of formula (II), in which L' is delimited from the compounds of formula 3 of document (1), and/or by the use of halogenating agents excluding HX or $X_2$.

15. In these circumstances, the Board finds that a proper assessment of unity of invention and ultimately of inventive step cannot be made without a substantive examination procedure by a competent authority, during which the Applicant has the opportunity to comment. However, according to the decision of the Enlarged Board of Appeal G 1/89 mentioned above, the ISA does not have the power to carry out such activities, but may only form a provisional opinion on novelty and inventive step for the purpose of carrying out an effective search (see, in particular, points 3, 8.1 and 8.2 of the Reasons).

Consequently, having regard to the Applicant's submission that the **essential feature** of the claimed invention is related to the **halogenation step**, the Board finds that it is a matter to be decided in a subsequent substantive examination how to (re)define the halogenation step in Claims 1 and 5.

16. Thus, in view of these considerations, the Board concludes that the ISA's objection against unity of invention and its subdivision of the claimed subject-matter of the application in suit into the two inventions indicated under point III above, do not meet the requirements set out in decision G 1/89 (see point 5 above), in particular, that the charge of additional search fee(s) by an ISA should always be made with a view to giving the applicant fair treatment and should be made only in clear cases. Consequently, the Applicant's protest was entirely justified.

17. Therefore, pursuant to Rule 40.2(c) and (e) PCT, the additional search fee and the protest fee must be refunded.

**Order**

**For these reasons it is decided that:**

1. The invitation to pay the additional search fee is unfounded.

2. The reimbursement of the additional search fee and the protest fee is ordered.

The Registrar: The Chairman:

N. Maslin A. Nuss